

Mr. Lee D. Allen, P.E.
Northeast Civil Solutions

300 pounds per cubic inch (pci) as the Westergaard modulus of subgrade reaction on top of the base course layer.

In Area 3 of the Site, due to anticipated long-term settlements we recommend that both the apartment floors and any garage floor be designed and constructed as elevated structural floors fully supported on foundation grade beams and timber piles as recommended above.

Pavements

With proper site preparation and drainage, the native subgrades should provide adequate strength to support the proposed traffic loading. Due to the potential for long term settlements rigid pavements are not recommended in Area 3. Additionally, bituminous wearing surfaces should not be applied until primary settlements beneath embankments have dissipated in Area 3. Pavements in entrances and drives should be designed according to the MaineDOT design procedures and utilizing the following soil parameters for flexible pavements:

Soil Subgrade Parameters:

| | |
|--------------------------------------|-----------|
| AASHTO Subgrade soils classification | A-1-b |
| ACE Frost Susceptibility Group | F2 |
| CBR (SM) | 20 |
| Westergaard Subgrade Modulus, k | 250 pci |
| Effective Resilient Modulus, M_R | 4,500 psi |

A recommended typical pavement section for truck lanes and entrances is provided in the following table and is based on estimated traffic criteria, subgrade design parameters, and American Association of State Highway and Transportation Officials (AASHTO) design guidelines for flexible pavements. A reduced typical pavement section for areas subject to passenger vehicles only is also provided.

Table 4: Recommended Flexible Pavement Sections

| Truck Lanes and Entrances | | | | |
|----------------------------------|-------------------------|-----------------------|-----------------------|-------------------|
| Layer | Top | Binder | Base | Subbase |
| Thickness (in.) | 2 | 2 | 4 | 12 |
| MaineDOT Spec. | 703.09, Type 12.5 mm | 703.09, Type 19 mm | 703.09, Type 19 mm | 703.06, Type B |

| Passenger Vehicles Only | | | | |
|--------------------------------|-------------------------|-----------------------|-----------------------|-------------------|
| Layer | Top | Binder | Base | Subbase |
| Thickness (in.) | 1.5 | 2.5 | 0 | 12 |
| MaineDOT Spec. | 703.09, Type 12.5 mm | 703.09, Type 19 mm | 703.09, Type 19 mm | 703.06, Type B |

Earth-Retaining Structures

Due to the depth of fill and cuts for the proposed site grades, construction of two retaining walls is required for the development. An approximately 800-foot long retaining wall is proposed for the eastern property boundary of the Site and a 60-foot long retaining wall is proposed to support soils at the embankment near the existing power plant on the Presumpscot River. As currently proposed, the 800-foot wall will range in height from approximately 12 to 3 feet and will support soils on the easterly abutting property. Based upon our subsurface investigations, portions of this wall will require bedrock cuts as great as 9 feet to achieve the required site grades.

Due to the close proximity of the power plant and Presumpscot River, it should be anticipated that the required retaining wall will require temporary sheeting and possibly underpinning of adjacent foundations during construction. Temporary cofferdams and dewatering systems should also be anticipated to build the retaining wall foundation in dry, stable conditions. Due to the height and assumed loading, we anticipate this wall will be designed as a reinforced-concrete cantilever wall supported on deep piles. However, additional subsurface exploration in the vicinity of the proposed wall and investigation of the adjacent foundations will be required to confirm these recommendations.

In general, foundation walls, loading docks, or earth-retaining structures should be designed to resist lateral pressures generated by soil backfill materials and any temporary or permanent surcharge loads. At-rest conditions should be assumed for the design of loading dock walls and other walls that are rigid and braced prior to backfilling. Walls that are free to deflect or rotate may be designed assuming active conditions.

The following parameters are based on Rankine's Lateral Earth Pressure Theory and may be utilized to compute the lateral earth pressures for rigid walls constructed with level backfill, whichever apply:

| | <u>Active</u> | <u>At-Rest</u> |
|---|---------------|----------------|
| Coefficient of Lateral Earth Pressure (Level Backfill) | 0.27 | 0.45 |
| Equivalent Fluid Weight, pounds per cubic foot (pcf) | 32 | 54 |

For sliding and overturning stability, the following design parameters are recommended:

| | |
|--|-----------|
| Unit weight of granular backfill | 120 pcf |
| Coefficient of sliding friction, μ | 0.50 |
| Maximum foundation edge pressure | 4,000 psf |

The backfill should be adequately drained to minimize hydrostatic pressures behind the wall. For this purpose, a foundation drain is recommended. The drain should consist of a nominal 4-inch-diameter perforated pipe installed behind the wall and at the foundation bearing grade level. The pipe should be embedded in at least 6 inches of clean gravel (less than 2% passing No. 200 sieve) material that is also placed directly behind the wall in a minimum 12-inch-wide trench. The clean gravel should be wrapped in a synthetic filter fabric such as Mirafi 140N or equal to prevent clogging. Additionally, an impervious cover should be placed at the ground surface to minimize infiltration of surface runoff.

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Underground Utilities/Stormwater Infiltration Design

The subsurface native granular soils are considered to be slightly corrosive to gray or ductile cast-iron pipe. However, the existing fill soils may contain corrosive materials, and therefore, we recommend that utilities placed within the existing fill soils be adequately protected from corrosion. Utility trenches should be properly excavated and shored according to the recommendations provided above. Utility trenches should be backfilled according to the recommendations for fill and backfill provided below. Construction of utilities in Area 3 of the Site should be completed only after settlements due to fill have substantially dissipated.

Based on our understanding of project program requirements, the proposed stormwater collection system will not require subsurface infiltration, and therefore soil permeability design parameters are not required.

Fill and Backfill

The following materials and compaction effort are recommended for use in areas of fill and backfill:

| <u>Type</u> | <u>Size</u> | <u>% Passing</u> | <u>Compaction</u> |
|-----------------|-------------|------------------|-------------------|
| Structural Fill | 3" | 100 | 95% ASTM D 1557 |
| MaineDOT Spec. | ¼" | 25–100 | 8-inch lifts |
| 703.06, Type E | No. 40 | 0–50 | |
| | No. 200 | 0–7.0 | |
| Embankment Fill | 6" | 100 | 92% ASTM D 1557 |
| MaineDOT Spec. | ¼" | 0–70 | 8-inch lifts |
| 703.20 | No. 200 | 0–10 | |
| General Fill | 8" | 100 | 90% ASTM D 1557 |
| | | | 12-inch lifts |

Due to the fine grain content of existing soils and oversized particles, the existing excavated material is considered unsuitable for Structural Fill. Imported Structural Fill should be placed beneath and adjacent to all structures and utilities. Embankment fill should be placed beneath pavements.

On-site soils and materials from site preparation and demolition operations, such as concrete, brick, masonry, or blasted rock may be crushed, reprocessed, or mixed with off-site soils to create suitable Embankment and General fill materials, provided that the resulting material satisfies requirements specified herein. General Fill should be used in landscaped areas only. All permanent slopes steeper than 3H:1V (18° from horizontal) should be protected with suitable erosion-control blankets. Any permanent slopes steeper than 2H:1V (27°) should be protected with stone rip-rap. Stone rip rap should conform with MaineDOT Specification 703.26 for Plain RipRap, consisting of either field stone or rough, unhewn quarry stone with at least 50 percent of the stone by volume exceeding fifty pounds in weight. In highly erodible environments such as river banks, the stone rip-rap should be designed according to U.S. Army Corps river bank protection design standards and placed over geotextile filtration fabric similar to Mirafi 140N. River banks should not exceed 2H:1V (27°) slopes. Permanent slopes in dry land and where seepage is not a concern should not be steeper than 1.5H:1V (34°). Grades should gently slope away

Mr. Lee D. Allen, P.E.
Northeast Civil Solutions

from building foundations and provide the minimum soil cover for protection of foundation subgrades from frost penetration.

A two-dimensional global slope stability analysis was performed for the Site from selected interpreted soil profiles that included proposed site grades and fills areas overlying the existing fill, organic, and clay subsoil layers. These analyses included both Bishop Modified and Ordinary Method of Slices calculations. Based on these calculations, the proposed embankments and fills have suitable factors of safety from rotational slope failure of the underlying clay and organic fills.

Construction Quality Control

The geotechnical engineer should be provided the opportunity to review the final design and specifications to ensure recommendations presented herein have been properly interpreted and applied. It is recommended that all backfill and compaction be inspected and tested by a qualified firm to ascertain that the proper materials are placed and adequately compacted. The geotechnical engineer should review all soil inspection and testing reports and monitor site development and foundation subgrade preparation to determine the necessity for additional cut and backfill beneath building subgrades. The geotechnical engineer should also review the contractor's subgrade settlement survey and monitoring program during the placement of fill and, on the basis of this survey, determine the time-rate of settlement and recommended sequence for installation of structures, utilities, and pavements in Area 3.

CLOSURE

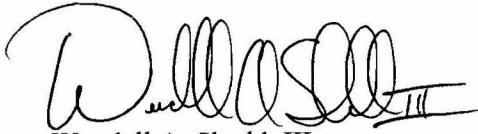
This report has been prepared to assist the Site and structural engineers in the design and construction of foundations, pavements, and Site structures related to the proposed development at 7 to 13 Depot Street, South Windham, Maine. The recommendations have been presented on the basis of an understanding of the project as described herein, and through the application of generally accepted foundation engineering practices. No other warranties, expressed or implied, are made.

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Northeast Civil Solutions

We have enjoyed working with you on this phase of your project. Further investigations recommended in this report may be provided upon your request and written authorization. Should you have any questions regarding this report or require additional assistance, please do not hesitate to call.

Sincerely,

OAK ENGINEERS, LLC.


Wendell A. Shedd, III
Senior Geotechnical Engineer



Paul D. DeStefano, Ph.D., P.E.
Director, Geotechnical and Structural Services

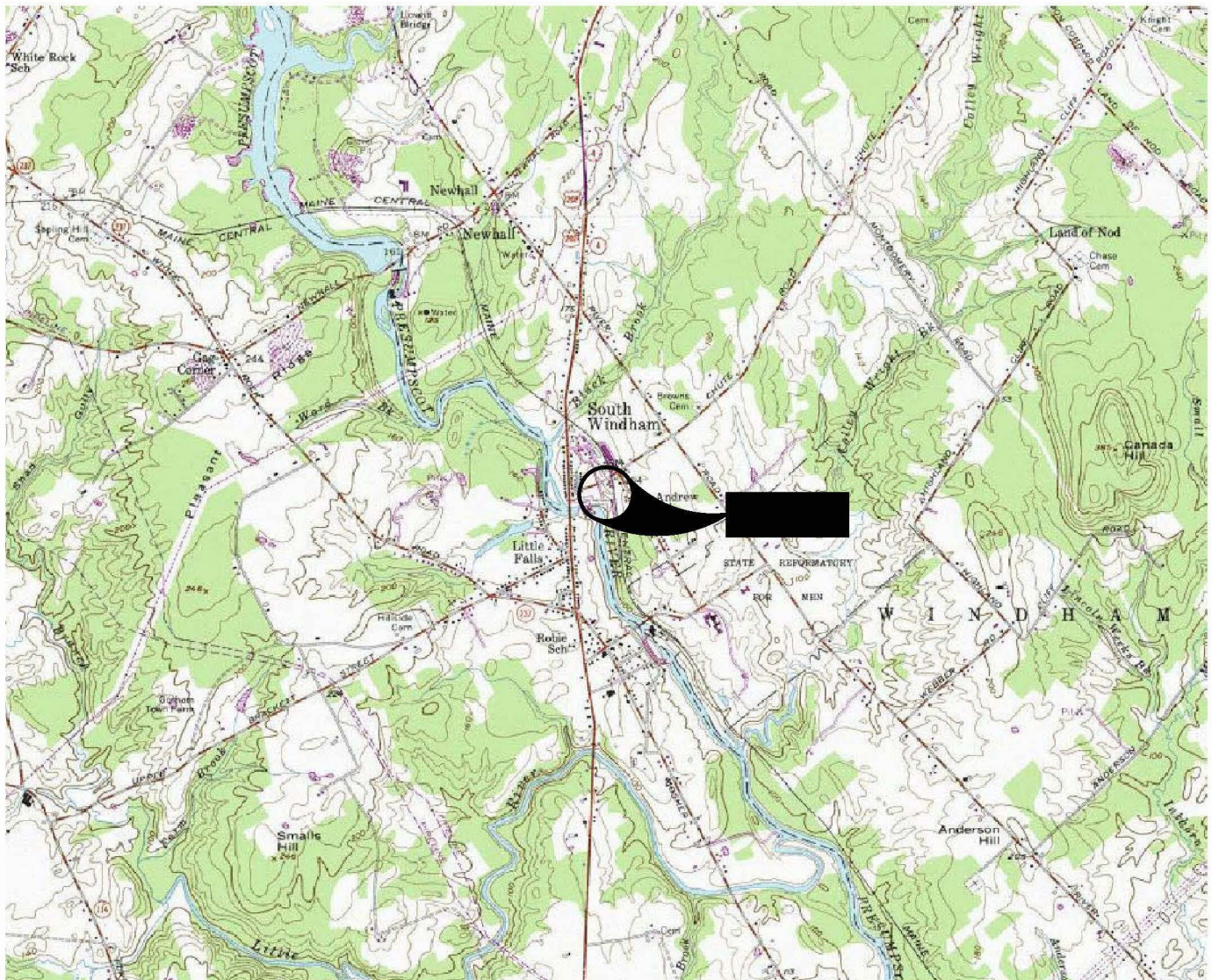
WAS/PDD:ss
Attachments

cc: Steve Etzel, Questor, Inc.

ATTACHMENT A

Figures

Geotechnical Investigation
Village at Little Falls, LLC
7 to 13 Depot Street
South Windham, Maine

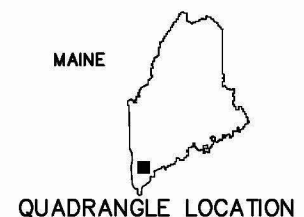


TAKEN FROM U.S.G.S. 7.5x15 MINUTE SERIES TOPOGRAPHIC MAP OF GORHAM, MAINE-1957 (REVISED 1975).

CONTOUR INTERVAL IS 20 FEET

SITE COORDINATES: LATITUDE 43°44'06"
LONGITUDE 70°25'25"

UTM COORDINATES: 48: 43: 421mN
3: 85: 345mE



SCALE in FEET
1: 25,000

OAK
ENGINEERS

Brown's Wharf
Newburyport, MA 01950
(978) 465-9877

PREPARED FOR:

NORTHEAST CIVIL SOLUTIONS
153 U.S. ROUTE 1
SCARBOROUGH, MAINE

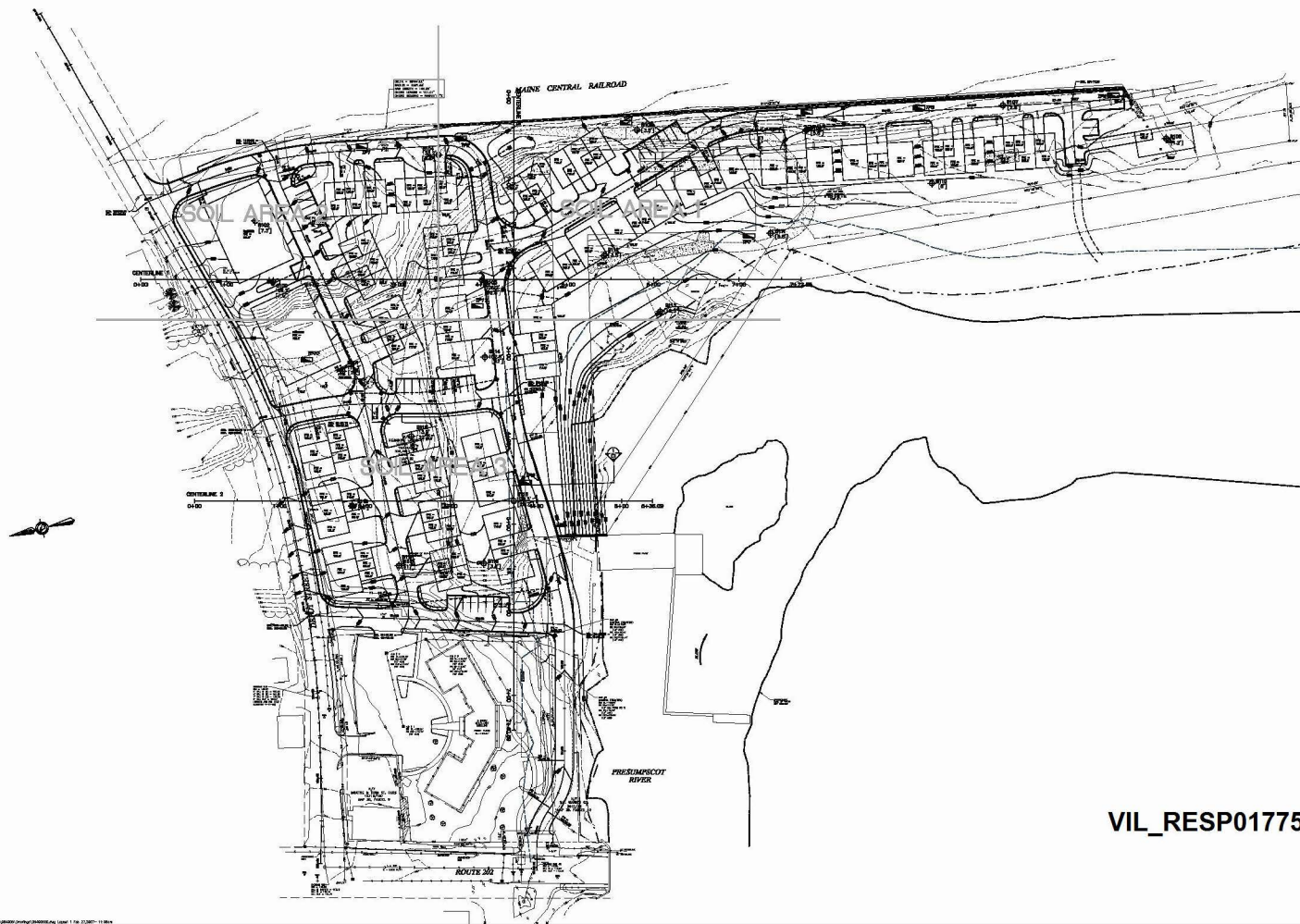
DATE: FEBRUARY 26, 2007

PROJECT: 064006

FIGURE: 1

SITE:

VILLAGE AT LITTLE FALLS
13 DEPOT STREET
SOUTH WINDHAM, MAINE
VIL_RESP01774

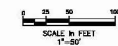


**VILLAGE AT
LITTLE FALLS**

13 DUPOT 81 FILL
SOUTH WINDHAM, MAINE

Prepared For:

NORTHEAST CIVIL SOLUTIONS
155 US ROUTE 1
BOARDOUR, ME 05641



OAK
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Branch Office
Newport, MA 01890
Tel: (508) 443-8877
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www.oakengineers.com

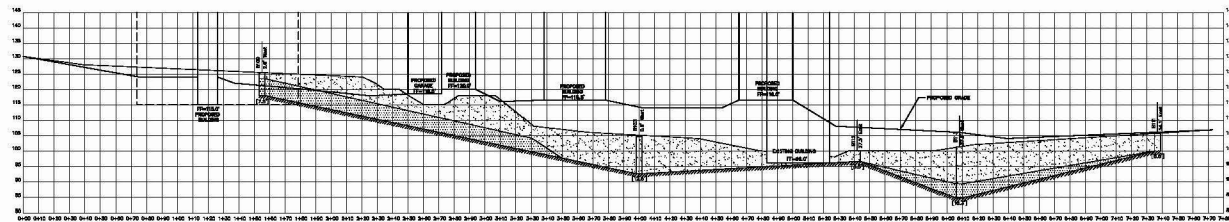
SITE PLAN

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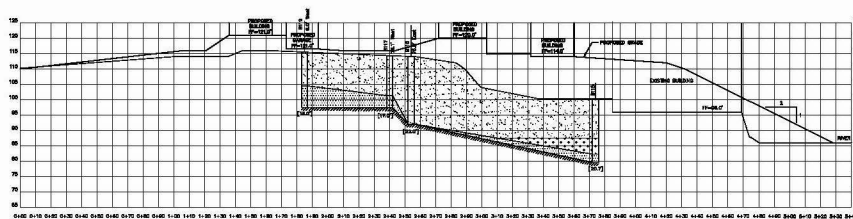
| No. | Revision/Issue | Date |
|----------|----------------|---------------|
| Drawn by | DEG | Checked by |
| Drawn by | DEG | Approved by |
| Project | 084006 | Date |
| Drawn | | FEBRUARY 2007 |

VIL_RESP01775

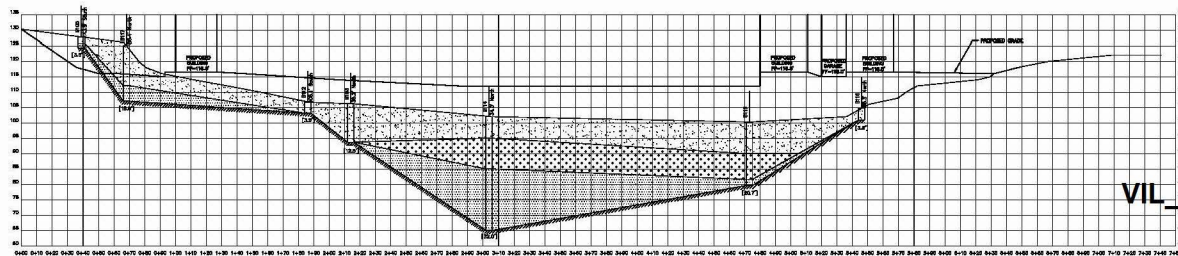
C1



PROFILE 1



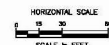
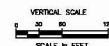
PROFILE 2



PROFILE 3

LEGEND

- APPARENT BEDROCK
- SILTY SAND/FILL
- CLAY/SILT
- ORGANICS



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APPARENT
SUBSURFACE
PROFILES

| No. | Revision/Issue | Date |
|-----|----------------|------|
| 1 | Initial | POD |
| 2 | Revised | POD |
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VIL RESP01776

C2

ATTACHMENT B

Soil Boring and Test Pit Logs

Geotechnical Investigation
Village at Little Falls, LLC
7 to 13 Depot Street
South Windham, Maine



BORING LOG:

B101

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 23 Feet | Logged By: | WAS |
| GW encountered: | Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|---|----------------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Black to Dark Brown f-c SAND, little Silt, trace Gravel | dry to moist | | SS-1 | 8,3 3,3 | 24/12 | SM | 6 | |
| | (loose) | moist | | SS-2 | 2,3 3,3 | 24/16 | SM | 6 | |
| 5 | Olive CLAY, some silt, trace fine Sand, slightly plastic to plastic | moist - PP = 2.5 tsf | | SS-3 | 2,2 3,3 | 24/20 | CL | 4 | |
| | | moist - w = 27.2% | | SS-4 | 4,3 3,5 | 24/24 | CL | 6 | |
| | | moist | | SS-5 | 3,4 4,4 | 24/24 | CL | 8 | |
| 10 | | moist to wet | | SS-6 | 4,4 5,5 | 24/24 | CL | 9 | |
| | | | | | | | | | |
| 15 | | wet | | SS-7 | 3,3 3,3 | 24/24 | CL | 6 | |
| | | | | | | | | | |
| 20 | | wet | | SS-8 | 4,8 12,18 | 24/24 | CL | 20 | |
| | (stiff to medium) | | | | | | | | |
| 25 | Auger Refusal - End of Boring @ 23' | | | | | | | | |
| | | | | | | | | | |
| 30 | | | | | | | | | |
| | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

CLIENT:

Northeast Civil Solutions

SITE:

Village at Little Falls
7 to 13 Depot Street
South Windham, Maine

VIL_RESP01778



BORING LOG:

B102

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 7.3 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|--|--------|---------------|-------------------------------|--------------------------------|-------------|------|------|
| | Gray to Brown f-c SAND, some Gravel, little Silt (loose) | dry to moist | | SS-1 | 24,14 9,3 | 24/15 | SM | 23 | |
| | Olive SILT, some Clay, trace fine Sand, slightly plastic to plastic | moist | | SS-2 | 2,3 2,3 | 24/17 | ML | 5 | |
| 5 | | moist - w = 26.2% | | SS-3 | 2,3 5,5 | 24/20 | ML | 8 | |
| | (stiff to medium) | moist - weathered shale pieces in spoon | | SS-4 | 5,10 50/3" | 15/10 | ML | >100 | |
| | Auger and Split Spoon Refusal - End of Boring @ 7.3' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

CLIENT:

Northeast Civil Solutions

SITE:

Village at Little Falls

7 to 13 Depot Street

South Windham, Maine

VIL RESP01779

Project No.:

064006

Page:

1



BORING LOG:

B103

| | | | | | |
|-------------------|-----------|------------------|-----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 12.5 Feet | Logged By: | WAS |
| GW encountered: | 11 Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|---------------------------------|--------|---------------|-------------------------------|--------------------------------|-------------|------|------|
| | Topsoil | dry to moist | | SS-1 | 4,4 50/4" | 16/6 | SM- ML | >100 | |
| | Olive Brown SILT and fine SAND | moist - kerosene odor | | SS-2 | 4,7 15,17 | 24/7 | SM- ML | 22 | |
| 5 | becoming Dark Brown to Black | moist - wood pieces | | SS-3 | 4,5 6,9 | 24/8 | SM- ML | 11 | |
| | becoming Olive Brown with trace fine Gravel (firm) | moist | | SS-4 | 7,9 5,4 | 24/7 | SM- ML | 14 | |
| 10 | Light Brown f-m SAND and Gravel, little Silt | moist - coal pieces - w = 12.5% | | SS-5 | 4,5 3,3 | 24/8 | GM- SM | 8 | |
| | (loose) | wet | | SS-6 | 2,2 3,1 | 24/12 | GM- SM | 5 | |
| | Auger Refusal - End of Boring @ 12.5' | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

CLIENT:

Northeast Civil Solutions

SITE:

Village at Little Falls
7 to 13 Depot Street
South Windham, Maine





VIL RESP01780





Project No.:

064006

Page:

1

|  | | BORING LOG: | | B104 | | | | | |
|---|---|-------------------------------------|--|---------------------------|-------------------------------|----------------------------------|----------------------|----|------|
| | | Ground Elevation: See Plan | | Total Depth: 9 Feet | | Logged By: WAS | | | |
| | | GW encountered: N.O. Feet | | Boring Diameter: 6 Inches | | Date Drilled: 1/24/07 to 1/24/07 | | | |
| | | GW @ completion: N.M. Feet | | Well Stickup: 0 | | Driller: Northern Test Boring | | | |
| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
| | Black f-m SAND, some Silt (loose) | dry to moist - brick and coal ash |  | SS-1 | 8,7 | 24/21 | SM | 14 | |
| | Olive SILT and fine SAND, trace Gravel (firm) Auger Refusal on weathered rock | moist - shaley rock pieces in spoon |  | SS-2 | 7,6 4,5 18,50/ 4" | 24/10 | ML | 23 | |
| 5 | | RQD = 68.3% |  | RC-1 | | 60/60 | | | |
| 10 | End of Boring @ 9' | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| NOTES: 1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA) 2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer). | | | CLIENT: Northeast Civil Solutions SITE: Village at Little Falls 7 to 13 Depot Street South Windham, Maine | | | | | | |
| | | | Project No.: 064006 | | Page: 1 | | VIL_RESP01781 | | |

|  | | BORING LOG: B105 | | | | | | | |
|---|--|-----------------------------|---|---------------------------|---|----------------------------------|-------------|----|------|
| | | Ground Elevation: See Plan | | Total Depth: 9 Feet | | Logged By: WAS | | | |
| | | GW encountered: N.O. Feet | | Boring Diameter: 6 Inches | | Date Drilled: 1/24/07 to 1/24/07 | | | |
| | | GW @ completion: N.M. Feet | | Well Stickup: 0 | | Driller: Northern Test Boring | | | |
| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
| | Dark Gray to Black f-m SAND, some Silt (loose) | dry to moist - brick pieces |  | SS-1 | 22, 17 7, 7 | 24/22 | SM | 24 | |
| | Olive SILT, trace fine SAND, trace Gravel (firm) Auger Refusal on weathered rock | moist - w = 24.7% |  | SS-2 | 5, 7 9, 50/3" | 21/17 | ML | 16 | |
| 5 | | RQD = 73.3% |  | RC-1 | | 60/60 | | | |
| 10 | End of Boring @ 9' | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| NOTES: 1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA) 2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer). | | | | | CLIENT: Northeast Civil Solutions | | | | |
| | | | | | SITE: Village at Little Falls 7 to 13 Depot Street South Windham, Maine | | | | |
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VIL RESP01782

**BORING LOG:****B106**

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 5.8 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|-------------------------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Dark Gray fine SAND, some Silt Olive SILT, trace fine Sand, non- to slightly plastic | dry to moist - ash | | SS-1 | 3,4 7,8 | 24/21 | ML | 11 | |
| | | moist | | SS-2 | 3,5 7,9 | 24/20 | ML | 12 | |
| 5 | (firm) | moist - rock pieces in sample | | SS-3 | 9,11 14, 50/2" | 20/20 | ML | 25 | |
| | Auger and Split Spoon Refusal - End of Boring @ 5.8' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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**BORING LOG:****B107**

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 2.8 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|---|--------------|--------|---------------|-------------------------------|--------------------------------|-------------|------|------|
| | Olive SILT and fine SAND, trace fine Gravel (firm) | dry to moist | | SS-1 | 9,7 | 24/22 | ML | 19 | |
| | | moist | | SS-2 | 12, 14 12, 50/3" | 9/7 | ML | >100 | |
| 5 | Auger and Split Spoon Refusal - End of Boring @ 2.8' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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**BORING LOG:****B108**

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 1.2 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|-------------------------------|--------|---------------|-------------------------------|--------------------------------|-------------|------|------|
| | Light Brown SILT and fine SAND | dry to moist - rock fragments | | SS-1 | 3,7 50/2" | 14/14 | ML | >100 | |
| | Auger and Split Spoon Refusal - End of Boring @ 1.2' | | | | | | | | |
| 5 | | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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BORING LOG:

B109

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 7.5 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|--------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Brown f-c SAND, some Gravel, trace Silt (firm) | dry to moist | | SS-1 | 18,15 6,5 | 24/22 | SW | 21 | |
| 5 | Olive SILT, some Clay, trace fine Sand, slightly plastic | | | | | | | | |
| | (medium) | moist | | SS-2 | 1,2 4,7 | 24/24 | ML | 6 | |
| 10 | Auger and Split Spoon Refusal - End of Boring @ 7.5' | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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**BORING LOG:****B110**

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 5.9 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|---------------------------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Dark Brown SILT and fine SAND | dry to moist | | SS-1 | 3,2 3,5 | 24/12 | ML | 5 | |
| | with trace Gravel/Rock pieces | moist | | SS-2 | 2,4 19,9 | 24/4 | ML | 23 | |
| 5 | (loose to firm) | moist - weathered schist pieces | | SS-3 | 10,7 12, 50/5" | 23/20 | ML | 19 | |
| | Auger and Split Spoon Refusal - End of Boring @ 5.9' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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**BORING LOG:****B111**

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 5.7 Feet | Logged By: | WAS |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|--|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Brown SAND, some Silt | dry to moist - concrete pieces | | SS-1 | 7,6 5,4 | 24/14 | SM | 11 | |
| | | moist - concrete pieces | | SS-2 | 8,6 4,5 5,7 | 24/12 | SM | 10 | |
| 5 | (loose to firm) | moist - concrete and possible ash pieces | | SS-3 | 11, 50/2" | 20/8 | SM | 18 | |
| | Auger and Split Spoon Refusal - End of Boring @ 5.7' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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| BORING LOG: B112 | | | |
|-------------------|-----------|----------------------------------|----------|
| Ground Elevation: | See Plan | Total Depth: | 3.5 Feet |
| GW encountered: | N.O. Feet | Boring Diameter: | 6 Inches |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 |
| | | Logged By: WAS | |
| | | Date Drilled: 1/24/07 to 1/24/07 | |
| | | Driller: Northern Test Boring | |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|-----------------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Brown f-c SAND, trace to little Silt (firm) | wet - concrete pieces | | SS-1 | 12, 14 9, 50/3" | 21/10 | SM | 23 | |
| 5 | Auger Refusal - End of Boring @ 3.5' | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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BORING LOG:

B113

| | | | | | |
|-------------------|-----------|------------------|------------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 16.25 Feet | Logged By: | WAS |
| GW encountered: | 11 Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|--|--------|---------------|-------------------------------|--------------------------------|-------------|------|------|
| | Rust Brown f-c SAND and f-c GRAVEL, trace Silt becoming Rust Red | dry to moist | | SS-1 | 9,10 10,9 | 24/20 | GM- SM | 10 | |
| | | moist - red oxide and ash - w = 13.3% | | SS-2 | 10,9 4,3 | 24/10 | GM- SM | 13 | |
| 5 | | moist - red oxide and ash | | SS-3 | 3,1 1,1 | 24/7 | GM- SM | 2 | |
| | (firm to very loose) | moist - coal ash pieces | | SS-4 | 2,1 1,2 | 24/9 | GM- SM | 2 | |
| 10 | Gray fine SAND, some Silt, trace to little organics | moist - ash | | SS-5 | 3,1 1,2 | 24/12 | SM | 2 | |
| | becoming fine to medium SAND, trace to little Silt (very loose) | wet | | SS-6 | 2,2 2,3 | 24/19 | SM | 4 | |
| | Gray SILT, some f-m Sand | | | | | | | | |
| 15 | (firm to dense) | saturated - rock pieces in sample | | SS-7 | 8,14 50/3" | 21/15 | ML | >100 | |
| | Auger and Split Spoon Refusal - End of Boring @ 16.25' | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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BORING LOG:

B114

| | | | | | |
|-------------------|-----------|------------------|----------|---------------|----------------------|
| Ground Elevation: | See Plan | Total Depth: | 33 Feet | Logged By: | WAS |
| GW encountered: | 11 Feet | Boring Diameter: | 6 Inches | Date Drilled: | 1/24/07 to 1/24/07 |
| GW @ completion: | N.M. Feet | Well Stickup: | 0 | Driller: | Northern Test Boring |

| DEPTH | DESCRIPTION | REMARKS | SAMPLE | SAMPLE NUMBER | BLOW COUNTS (per 6 inches) | PENETRATION/ RECOVERY (in.) | USCS SYMBOL | N | WELL |
|-------|--|-------------------------------|--------|---------------|-------------------------------|--------------------------------|-------------|----|------|
| | Olive Brown f-c SAND, some Silt (firm) | dry to moist | | SS-1 | 5,12 11,7 | 24/14 | SM | 23 | |
| | Black to Dark Brown f-c SAND, trace to little Silt | moist | | SS-2 | 5,5 7,5 | 24/16 | SM | 12 | |
| 5 | (loose) | moist | | SS-3 | 2,2 2,2 | 24/12 | SM | 4 | |
| | Olive Brown f-m SAND, some Silt | moist - wood pieces | | SS-4 | 2,2 2,3 | 24/12 | SM | 4 | |
| 10 | | moist - wood chips and leaves | | SS-5 | 1,1 2,2 | 24/16 | SM | 3 | |
| | | wet - wood pieces/chips | | SS-6 | 3,4 4,3 | 24/19 | SM | 8 | |
| 15 | (loose) | saturated - large wood pieces | | SS-7 | 3,3 3,3 | 24/11 | SM | 6 | |
| 20 | Blue Gray CLAY, trace Silt, trace fine Sand | wet to saturated | | SS-8 | 1,2 2,1 | 24/20 | CL | 4 | |
| 25 | | Su = 930 psf, w = 43.0% | | ST-1 | | | CL | | |
| | | wet | | SS-9 | 1,1 1,1 | 24/24 | CL | 2 | |
| 30 | | wet | | SS-10 | 1,1 1,2 | 24/24 | CL | 2 | |
| | (soft) | | | | | | | | |
| 35 | Auger Refusal - End of Boring @ 33' | | | | | | | | |

NOTES:

1. Drilling Method: Track mounted Diedrich D-50 with 2-1/4" i.d. Hollow Stem Auger (HSA)
2. Soil Sampling: 2-inch Split Spoon Sampler driven with 140 lb. hammer falling 30 inches (Auto-Hammer).

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